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LB1830MC

Monolithic Digital IC

Low-Voltage, Low-Saturation

Bidirectional Motor Driver

Overview

The LB1830MC is a low-saturation bidirectional motor driver IC with brake function for use in low-voltage applications.

As both of forward and reverse outputs are regulated, it is especially suited for use in portable equipment.

Features

- Wide operating voltage range: 3.0 to 9.0 V
- Low saturation voltage: 0.2V at $I_O = 40\text{mA}$ (typ)
- Low current drain at standby mode (0.1 μA or less)
- Brake function
- Regulated voltage value (forward/reverse) setting available by one variable resistor
- Regulated output/saturation output switching available
- Built-in spark killer diodes
- Small package: SOIC10

Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
maximum supply voltage	$V_{CC\text{ max}}, V_S\text{ max}$		10.5	V
Output current	$I_M\text{ max}$		500	mA
Input supply voltage	V_{IN}		-0.3 to +10	V
Allowable power dissipation	$P_d\text{ max}$	Mounted on a specified board *	0.82	W
Operating temperature	T_{opr}		-20 to +80	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +125	$^\circ\text{C}$

* Specified board: 114.3mm \times 76.1mm \times 1.6mm, glass epoxy board.

Caution 1) Absolute maximum ratings represent the value which cannot be exceeded for any length of time.

Caution 2) Even when the device is used within the range of absolute maximum ratings, as a result of continuous usage under high temperature, high current, high voltage, or drastic temperature change, the reliability of the IC may be degraded. Please contact us for the further details.

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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Allowable Operating Ranges at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}, V_S		3.0 to 9.0	V
Input high level voltage	V_{IH}		2.0 to 9.0	V
Input low level voltage	V_{IL}		-0.3 to +0.3	V
Control voltage	V_C		1.0 to 6.0	V

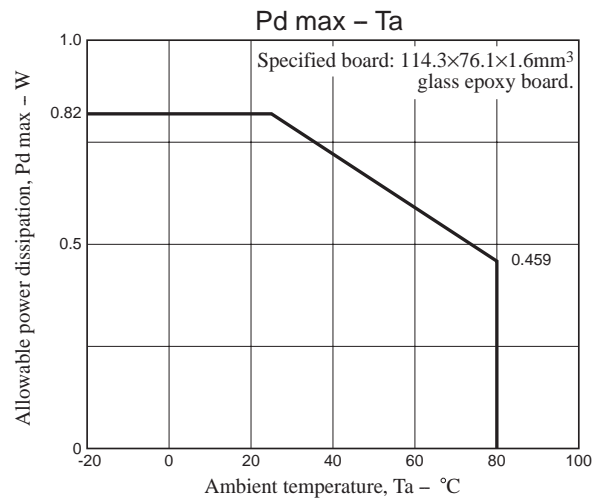
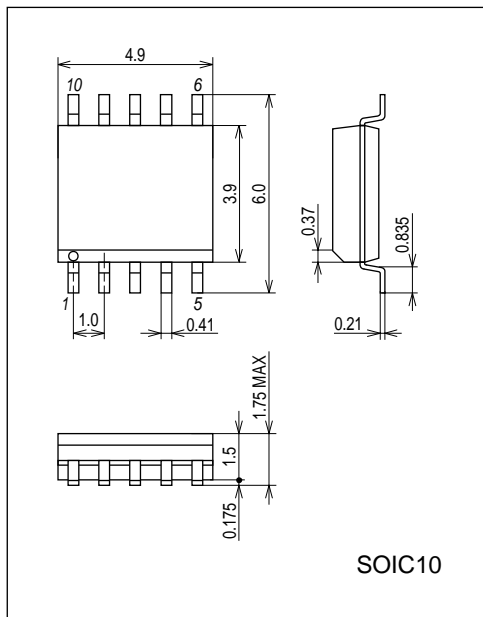
Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 6\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	I_{CC0}	$I_{N1} = I_{N2} = V_m = 0\text{V}$, $V_C = V_{ref}$ at standby mode		0.1	10	μA
	I_{CC1}	Forward/reverse, control, load OPEN		2	3	mA
	I_{CC2}	Forward/reverse, saturation, load OPEN		3	5	mA
	I_{CC3}	Braking, load OPEN		5	8	mA
Output saturation voltage	V_{sat1}	$I_O = 40\text{mA}$ (upper side + lower side)		0.2	0.3	V
	V_{sat2}	$I_O = 80\text{mA}$ (upper side + lower side)		0.4	0.6	V
Reference voltage	V_{ref}	$I_{V_{ref}} = 1\text{mA}$	1.85	2.0	2.15	V
Voltage characteristics of output voltage	$\Delta V_{O\text{-Line}}$	$V_O = 5\text{V}$, $V_{CC} = 5.5$ to 9V , $I_O = 40\text{mA}$			80	mA
Current characteristics of output voltage	$\Delta V_{O\text{-Load}}$	$V_O = 5\text{V}$, $V_{CC} = 6\text{V}$, $I_O = 10$ to 80mA			50	mA
Input current	I_{IN}	$V_{IN} = 5\text{V}$		90	150	μA
Output voltage	V_O	$V_C = 2\text{V}$	$2.3 \times V_C$		$2.5 \times V_C$	V

Package Dimensions

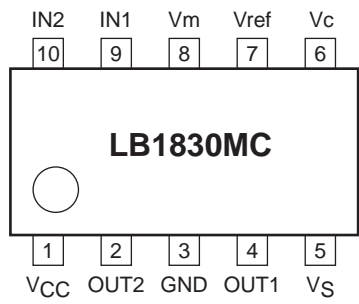
unit : mm (typ)

3426A

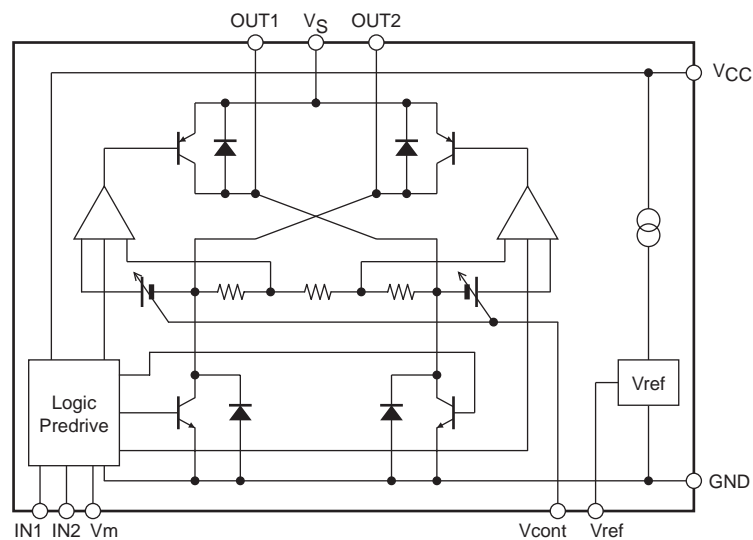


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Pin Assignment



Block Diagram



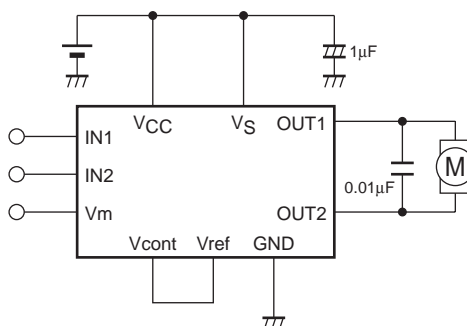
- The output voltage (voltage between output pins) V_O during drive with constant voltage is set as follows:
$$V_O = (V_C \text{ pin input voltage}) \times 2.4 \text{ (typical)}$$
- There is no hierarchical relationship among voltages; VCC (control supply voltage), VS (motor supply voltage), IN1/IN2 (input signal voltage).

Truth Table

Input			Output		Mode
IN1	IN2	Vm	OUT1	OUT2	
L	L	L	OFF	OFF	Standby
H	L	L	H	L	Forward (Regulated)
H	L	H	H	L	Forward (Saturation)
L	H	L	L	H	Reverse (Regulated)
L	H	H	L	H	Reverse (Saturation)
H	H	*	L	L	Brake

* when in saturation mode, $V_C = V_S$ available.

Application Circuit Example



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